OptiHite

Height Measuring Instrument

User's Manual

Introduction:

The OptiHite is an accurate Height measuring instrument. The instrument is available with variable measuring heights. Please read the specifications for more details.

- OptiHite (400mm, 600, 1000mm)

The OptiHite, height measuring instrument basically consists of measuring column and controller unit, EL50M.
The Instrument is suitable for One-Dimensional measurements.

Specified operating temperature for OptiHite is in between 10°C to 40°C. However it is recommended that the best accuracy results are achieved at 20°C as the master slip sizes are defined at 20°C.

High quality, hardened and lapped stainless steel base pads with air bearings supplied for smooth movement of the instrument on granite surface plate.

Standard measuring probe is Ø6mm X 55mm long with carbide ball.

Actual measurement is carried out at the constant measuring force of 1.2 Newton.

The instrument is re-chargeable battery operated and if the battery is discharged it can also be operated by AC adaptor independently. OptiHite can be used on battery for 16 hrs. Its battery can be recharged fully within 6-8 hrs. Use the AC adaptor (Charger) for re-charging the batteries.

INDEX

1. Safety Measures:

Please read the following instructions carefully to avoid any damage due to improper handling of the instrument.

Manufacturer will not be responsible for any damages caused due to improper handling of the Instrument or if the instructions are not followed as mentioned in the manual.

- Instrument should be switched ON only after completing all electrical connections and mechanical installations.
- To get consistent performance of the instrument, do not dismantle or disassemble any assembled part.
- Do not expose the instrument, its components and accessories to rain or any other fluids. Protect the instrument from foreign materials to penetrate inside the connectors and small openings.
- Do not open Digital controller EL50M.
- If in case of operational failures in the instrument or any of its part (no display, over-heating, odd smell, etc) is observed, switch off the instrument immediately and disconnect the power supply. Contact your local OptiHite dealer for trouble-shooting.
- To get consistent performance it is important to take particular care at the time of handling every time.
- Instrument should be kept on grade zero, smooth & clean Granite surface plate.
- Avoid any shock to prevent the characteristics features of the instrument from losing its performance.
- Operate the instrument in a vibration free zone.
- Avoid direct contact with sunlight and excessive humidity.
- Avoid over heating or over cooling of the machine.
- Respect the indicated environmental conditions.
- Clean base pads periodically to remove foreign particles in between surface plate and machine base pads.
- *DO NOT USE THE INSTRUMENT FOR MARKING OR SCRIBING*.
- Use probes supplied by the manufacturer or dealer. Using locally made probes can give an additional stress on the measuring column and can damage the instrument.

2. Standard Scope of Supply:

Sr. No.	Description	Quantity
1	Main Instrument	1
2	Digital controller EL50M	1
3	AC Adaptor	1
4	Power supply cable	1
5	Probe Ø6mm X 55mm	1
6	Setting Master	1
7	Dust protection cover	1
8	Allen key set	1
9	Allen screws M8 for EL50M mounting	2
10	User Manual	1
11	Probe holder assembly	1
12	Base handle assembly	1
13	Data transfer cable USB	1
14	Data transfer software CD	1
15	Calibration Report	1

- While removing the instrument for un-packing, hold the instrument by base handle and the column cover.
- If the instrument has been stored at a temperature below 10°C, wait a few hours before unpacking to prevent the instrument parts from humidity condensation. Condensation can affect sensitive parts (like electronic components) of the instrument.

3. Installation and Commissioning:

- Clean the surface plate and base pad surface with clean fabric slightly soaked with alcohol or propane.

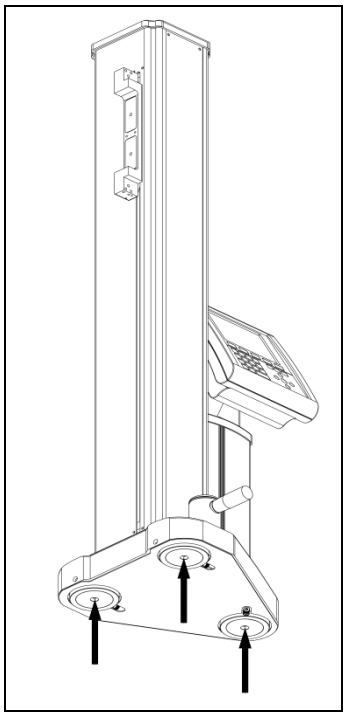


Figure 1
CLEAN BASE PAD

- Position the instrument on the surface plate with proper care.
- Release the transport lock: To unlock the instrument there is a small opening provided at the top of the main cover cap. Remove the rubber grommet and insert 5mm Allen-key (Socket head cap screw key) and unlock the screw (M6). See Figure 2.

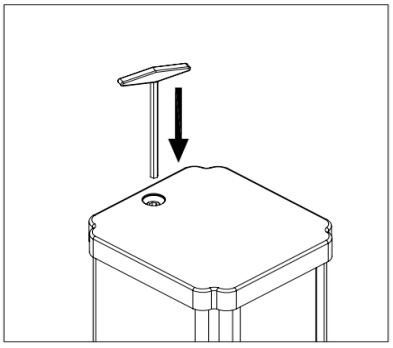


Figure 2

REMOVE TRANSPORT LOCK STUD FROM TOP CAP USING 5mm ALLEN KEY.

- Position the probe holder assembly along with probe as shown in Figure 3.

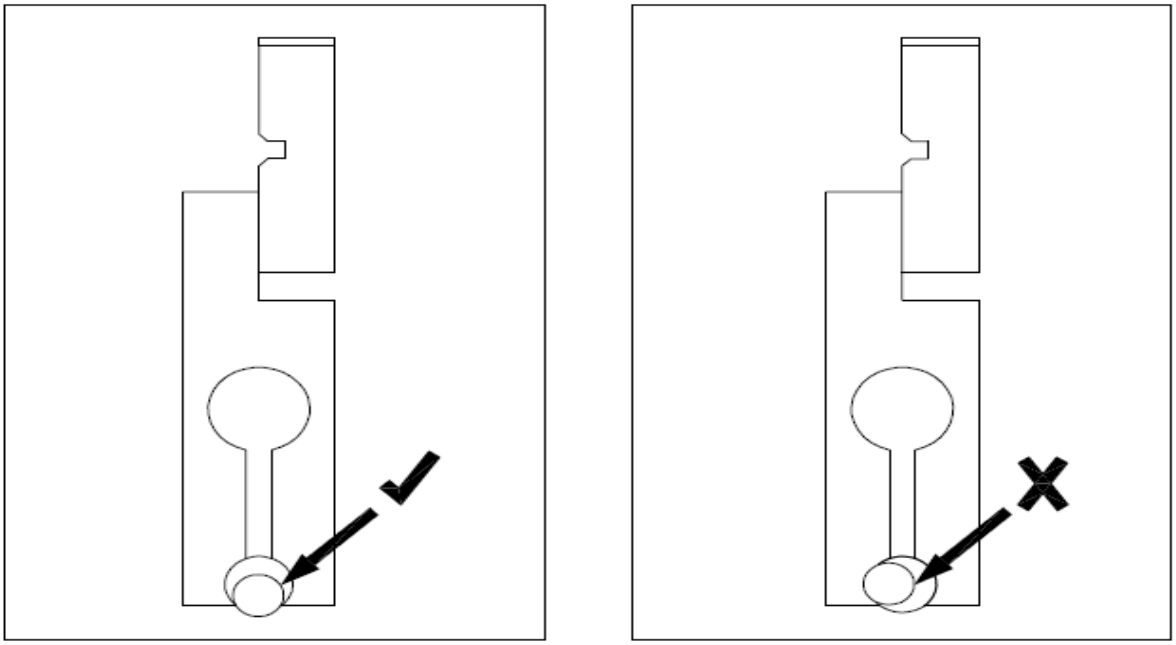


Figure 3

CORRECT PROBE POSITION

WRONG PROBE POSITION

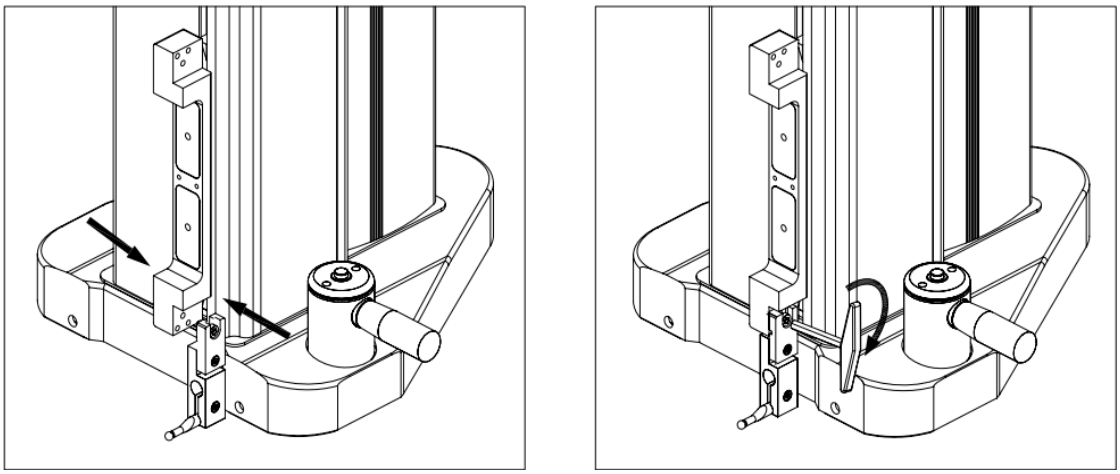


Figure 5

PLACE THE SQUARE PROBE HOLDER PROPERLY.

TIGHTEN THE M5 ALLEN KEY

- Mount digital controller unit EL50M with the help of two M8 Allen screws supplied (Use 6mm Allen-key). Avoid direct contact with the connector pins to protect the electronic components from static electricity.
-

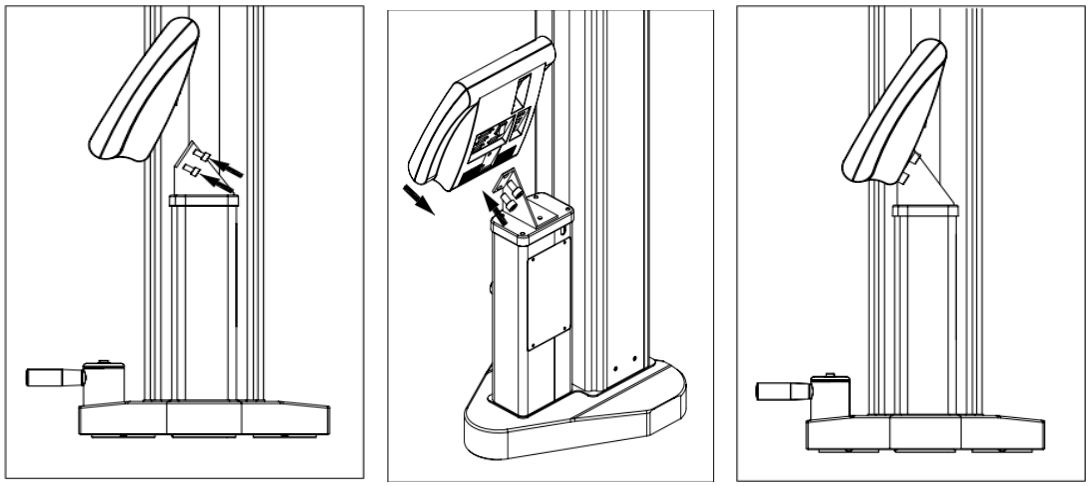


Figure 6

CLAMP DIGITAL CONTROLLER WITH THE HELP OF TWO M8 HEX SOCKET HEAD CAP SCREWS.

- Keep EL50M in switched off condition and then Connect Z (9 pin D Male) from interface cables to Z (9 pin D Female) connector on EL50M. Connect INTERFACE (15 pin D Female) on interface cables to INTERFACE (15 pin D Male) on EL50M.
- Before using the controller unit for the first time, connect the AC adaptor to the corresponding socket on the rear side of the controller unit and charge the battery for 6-8 hours.
- Before switching ON the instrument please read the instructions given in the GETTING STARTED segment.
    - **IT'S IMPORTANT TO CONDUCT BASE PLATE REFERENCE EACH TIME YOU SWITCH ON THE INSTRUMENT.**
- Now the Instrument is ready for use.

4. Measuring Accuracy

To achieve good accuracies and precision following instructions will be helpful:

- Use only Grade ‘0’ surface plate. Keep surface plate clean. Use soft and clean fabric, soaked with alcohol to clean the surface plate.
- Surface plate should be properly damped for vibration free operations of the instrument.
- Clean base pads provided at the bottom of the instrument periodically.
- Clean the work piece before starting any measurement task.
- Confirm that all the joints of probe holder assembly are tightened properly.
- Reference Zero to the surface plate is essential before starting any measurement task.
- Probe diameter calibration as instructed is essential to get accurate results.

5. Specifications:

Description	OptiHite 400	OptiHite 600	OptiHite 1000
Measuring Range	400 mm	600 mm	1000 mm
Expandable Range	715 mm	915 mm	1315 mm
Resolutions	0.005, 0.001, 0.0005 mm		
Repeatability*[1] (2S)	On plane ≤ 0.003 mm On Bore ≤ 0.005 mm		
Maximum Counting Speed	600 mm / sec		
Measuring Force	1.2 N ± 0.2		
Maximum Permissible error *[1] (L = Length in mm)	(3 + L / 250) µm (L = Length in mm)		
Squareness *[2]	6.5 µm	10 µm	15 µm
Battery Backup Time	16 hours		
Operation Temperature	10 °C to 40 °C		
Weight of Machine	20 Kg	22 Kg	28 Kg
Adaptor input	100 VAC to 240 VAC, 50/60 Hz		
Adaptor Output	24VDC, 2.5A		
Battery ratings	18V, 4000mA		
Standard probe	Carbide ball Ø6 x 55 mm		

Note:

*1 Values are valid with a standard probe at temperature of 20 °C ±0.5 °C.

*2 With electronic probe Magnascan50.

ACCURACY DEFINATIONS:

1. Repeatability error: This is the error in the ability of the instrument to give consistent readings for one measurement point when the travel of the probe is same. The repeatability is specified on 95% confidence level i.e. 2σ. This error is specified on ø 4 X 55 mm probe.
2. Position accuracy: This is the difference between a master length gauge value and the displayed value. This error is specified on the ø 4mm X 55mm probe at 20°C.
3. Squareness Error: This is an error displayed on controller EL50M if the instrument is checked in squareness mode with a dial indicator / Magnascan50 at 20°C. To display this error the dial indicator readings are manually entered in the EL50M controller. It is recommended to use a plunger type digital dial indicator for better results.
   Caution: This error is not the error that is shown by the dial indicator.

6. Description:

Machine:

1	Machine Column
2	Controller unit – EL50M
3	Probe holder
4	Mechanical probe
5	Test Piece
6	Machine handle
7	Machine base

Figure 8

Controller Unit - EL50M:

Figure 9

1	LCD Display
2	Numeric / Function Keys
3	Battery low led
4	Battery status led
5	Power ON/OFF led
6	Arrow Keys for Navigation
7	Memory Key
8	Menu Key

Description of Keys:

Key	Description
	Contacting a plane from above / Numeric Key 1
	Contacting a shaft from above / Numeric Key 2
	Contacting a bore from above / Numeric key 3
	Measuring Bore diameter and center / Numeric key 4
	Contacting a plane from below / Numeric key 5
	Contacting a shaft from below / Numeric key 6
	Contacting a bore from below / Numeric key 7
	Measuring Shaft diameter and center / Numeric key 8
	Measuring Groove width and center / Numeric key 9
	Measuring job squareness / Numeric key 0
	Referencing / Decimal entry
	Probe diameter calibration / ± entry
	Cancel key

	Printer key
	Enter key
	Menu key
	Display result memory key
	Up Arrow key
	Down Arrow key
	Left Arrow key
	Right Arrow key

7. Layout of the Screen:

Normal Counting

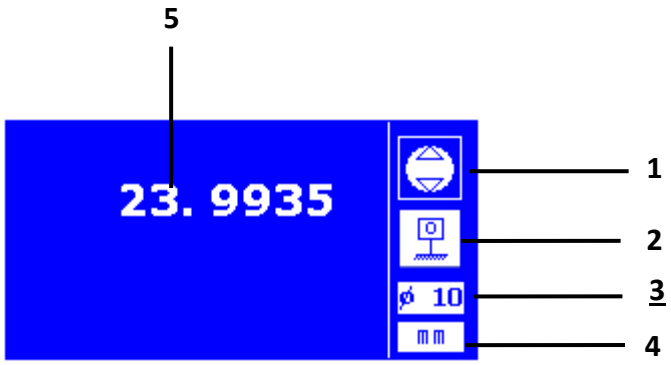


Figure 10

1	Graphics of last executed function
2	Graphics of selected reference
3	Probe diameter (in mm)
4	Measurement unit
5	Current Probe position

Result Screen

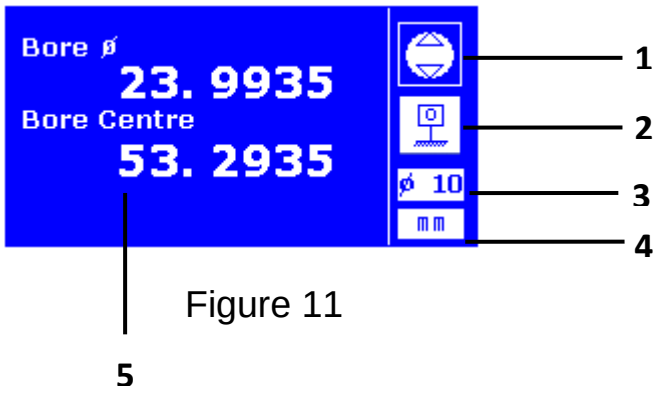


Figure 11

1	Graphics of last executed function
2	Graphics of selected reference
3	Probe diameter (in mm)
4	Measurement unit
5	Result of last executed function

8. Battery Indications:

A battery status is displayed using LED on EL50M controller. The following table will illustrate this in details.

Sr.No.	Symbol	Description
1	 Steady (Yellow)	Battery is getting charged (Fast charging process)
2	 LED OFF	Battery with Full capacity. LED turns OFF
4	 Blinking (Red)	Battery Low. LED turns RED. (DRO is functionally off and shows “Battery Low”. Connect the adapter” message and give beep. The user must charge the battery immediately. If this is not done, battery might get damaged and may need to be replaced)

The battery is trickle charged when it is used beyond its capacity or it is deeply discharged due to some reason. The controller senses this condition and first trickle charges this battery up to certain level and then it starts fast charging. The trickle time may vary depending on the level of discharging. When the adaptor is first plugged to start the battery charging the controller first starts with trickle charging for few minutes till it analyses the battery conditions and then starts fast charging. A deep discharged (depleted) battery may take maximum of 8 hours for trickle charging and then starts fast charging. Fast charging may take

maximum of 6-8 hours. This time may vary with different batteries and ambient temperature and the level of discharging.

Whenever charging a deep discharged battery, the controller might stop fast charging in between. This happens due to the use of instrument even after showing low battery.

9. Settings of EL50M

The EL50M setup can be accessed by pressing the [MENU] key.

The following options will be available:

1. User Settings

   Following options will be available in user settings:

   1) "Inch/mm" - Using this option the user can select any one of following measurement units.
      1. Metric (mm)
      2. Imperial (inch)
   2) "Display Resolution" - Using this option the user can select the display resolution.
      1. 0.5 Micron
      2. 1 Micron
   3) "Language" - Using this option user can select the language of DRO.
   4) "Change Zero Pt ½" - Using this option user can switch over to any of the following previously set references for the next measurements.
      1. Reference Point
      2. Zero Pt 1 On Part
      3. Zero Pt 2 On Part
   5) "Offset" - Offset is a function through which we can expand the measuring range by changing the probe position (see Figure 12). To expand the range a long length slip or a work piece with a known height is required. Place long length slip or work piece on surface plate. Position the probe in reverse conditions in the probe holder. Select the function from the following Contact above, Contact below or previously measured result from memory. After execution of this function "Offset" message will be displayed asking the operator to enter slip or work piece length. Enter the value of slip or work piece & press ENT key to complete the function. The measuring range can be expanded up to 580 / 880

mm. To remove offset, bring the probe back to its original position & go to user settings and select Offset Off. It is recommended to use this function also for depth measurements by depth probes other than standard probes.

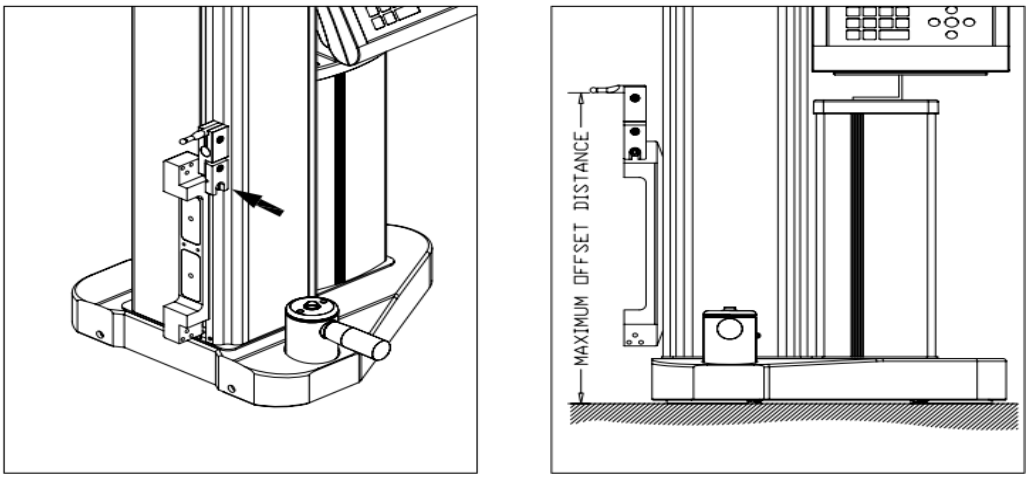


Figure 12

FOR OFFSET FUNCTION POSITION SQUARE PROBE HOLDER ASSEMBLY AS SHOWN	TIGHTEN SQUARE PROBE HOLDER ASSEMBLY WITH THE HELP OF M5 CAP HEAD SCREW

6) “Groove Edge” – This option is used to select which result to display from the list given below, during measurement of groove or ledge.
    1. Lower Edge
    2. Upper Edge
    3. Groove Centre
7) “Temperature Comp” – Following options will be available under temperature compensation,
    1. Compensation OnOff – Using this option user can ON or OFF temperature compensation.
    2. Material coeff. – Using this option user can enter the thermal coefficient of test piece material.
    3. Current Temp. – Using this option user can enter the current temperature of testing room.

8) “LCD Contrast” - Using this option user can increase or decrease the contrast of LCD.
9) “Sleep Timer” – The controller turns off LCD and goes into power saving mode when it is idle for set sleep timer value. Sleep timer can have value from 0 to 60 minutes. 0 value disables sleep timer. Any key operation will bring the controller in the normal measurement mode.

2. Factory Settings

   This is a password protected option used during calibration of the machine. This is not accessible to the user.

3. Functions

   1) “Distance” – Using this option user can find distance between any two previous stored results from memory. Refer 12.3 Distance Measurement function.

   2) “Ledge” – This option is use to select Ledge calculation function. After completion of this function controller will show result on screen. Refer 11.2.d Ledge measurement function.

   3) “Min-Max Delta” – This option is used to select Min-Max delta calculation function.
      In this function there are two options to select surface for Min-Max
      i. Min – Max from top side.
      ii. Min – Max from Bottom side.

      Refer 12.2. Function for detail operation.

   4) “Reset At position” - This option is used to reset current position of the main axis and this is taken as new reference for further measurement.
      Refer 12.4 functions for detail operation.

5) “Preset At position” - In this Option, current distance of axis set to value from user zero and this is taken as new reference for further measurement.
   Refer 12.5 functions for detail operation.

10. Getting Started:

Step 1: Switch ON EL50M.

Step 2: Base plate referencing

Base plate referencing must be executed by the user after every power “ON” of EL50M. Base plate referencing is cancelled if user presses any other key. Base plate referencing is also required if measuring probe is changed.

Base plate referencing can be performed by pressing the [] key twice.

Step 3: Probe diameter Calibration

It is recommended to calibrate the probe diameter every time a probe is changed. Pressing [] key will enable calibration of Probe diameter and shows “Stylus Calibration.!” message on screen. Before going into the function ensure that the probe is below the slip of calibration setting master supplied with the machine. Then Press [] key. Then controller first probe at slip’s bottom surface and give beep. Now remove Calibration setting master slowly. Now stylus goes up and comes down. Now place calibration setting master again to its previous position. Now controller performs probing at slip’s top surface and will give beep. Then controller shows of average probe diameter result on screen, with message “Measure Once more?” if user selects “1.Yes” then controller will start Probe diameter Calibration process again. To avoid recalibration process press “2.No” option. Here the user can edit the value of measured probe if required.

Press [] to save the calibrated result and exit from the function.

Press [] to exit without saving the result.

Memory of EL50M

The EL50M memory can be accessed by pressing the [] key. The following options will be available:

1. View Memory

   Using this option user can view results in the result memory. **Maximum number of Result – 500.**

2. Clear Memory

   Following options will be available in clear memory,

   1) "Last Reading" - Using this option user can delete last result in the result memory.
   2) "All Readings" - Using this option user can delete all results in the result memory.

Print function

Result memory in EL50M can be printed on Thermal printer or terminal software of PC by pressing the [] key. The following options will be available:

1. Print Selected

   Using this option user can print several selected results in result buffer.

2. Print All

   Using this option user can print all results in result buffer.

11. Basic Measurements:

The Basic measurements are broadly categorized in two categories:

1.2. Surface measurement:

a. Contact above Measurement:

In this function, a plane is contacted from above to determine the height of the plane from earlier selected reference point. The result is displayed on the display and gets stored in result memory as “Con_Abo”. This is illustrated in the Figure 13.

To perform this function press [] key.

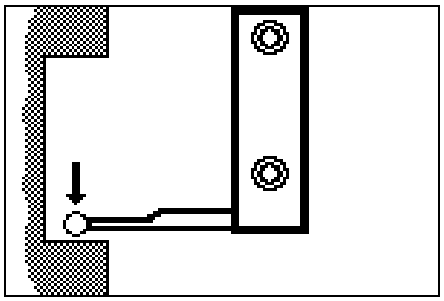


Figure 13.

b. Contact below Measurement:

In this function, a plane is contacted from below to determine the height of the plane from earlier selected reference point. The result is displayed on the display and gets stored in result memory as “Con_Blo”. This is illustrated in the Figure 14.

To perform this function press [] key

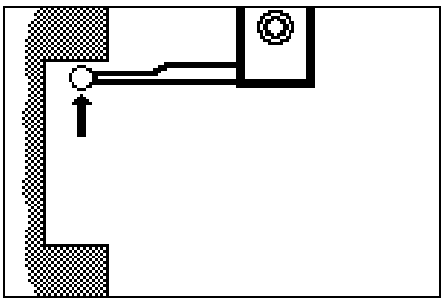


Figure 14.

c. Shaft above Measurement:

This function can be performed by pressing [ ] key. In this function, a shaft is scanned from above to get the highest point. The operator can move the job or machine. The result is displayed on the display and gets stored in result memory as “Shft_Ab”. This is illustrated in the Figure 15.

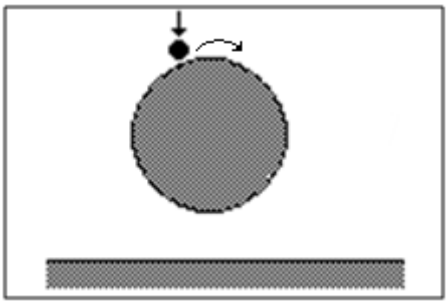


Figure 15

d. Shaft below Measurement:

This function can be performed by pressing [ ] key. In this function, a shaft is scanned from below to get the lowest point. For scanning shaft, the operator can either move the job or machine. The result is displayed on the display and gets stored in result buffer as “Shft_Bl”. This is illustrated in the Figure 16.

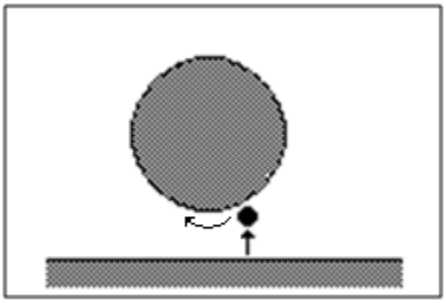


Figure 16.

e. Bore Above Measurement:

This function can be performed by pressing [ ] key. In this function, a bore (hole) is scanned from above to get the highest point. For scanning bore, the operator can either move the job or machine. The result is displayed on the display and

gets stored in result buffer as “Bor_Abo”. This is illustrated in the Figure 17.

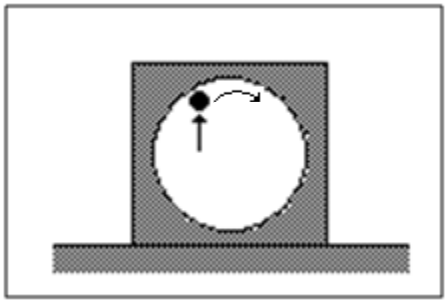


Figure 18

f. Bore below Measurement:

This function can be performed by pressing [] key. In this function, a bore (hole) is scanned from below to get the lowest point. . For scanning bore, the operator can either move the job or machine. The result is displayed on the display and gets stored in result buffer as “Bor_Blo. This is illustrated in the Figure 18.

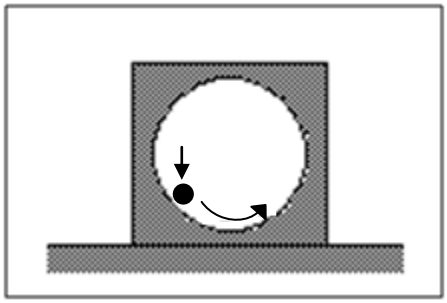


Figure 18

1.3. Diameter and center measurement:

a. Shaft diameter and center measurement:

This function can be executed using [] key. In this function, a shaft is scanned from below and above in one setup to get its diameter and center from the earlier selected reference point. To avoid interference with the job, the operator needs to adjust the probe manually after the first

surface scanning and then press [ENT] key to preceed with the second surface scanning. The result is displayed on the display and gets stored in result buffer as “Shft_Cn” and “Shft_Di” and the respective results. This is illustrated in the Figure 19.

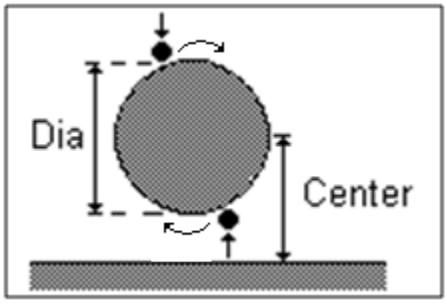


Figure 19

b. Bore diameter and center measurement:

This function can be executed using [4] key. In this function, a bore is scanned from above and below in one setup to get its diameter and center from the earlier selected reference point. The result is displayed on the display and gets stored in result buffer as “Bor_Cnt” and “Bor_Dia” and the respective results. This is illustrated in the Figure 21.

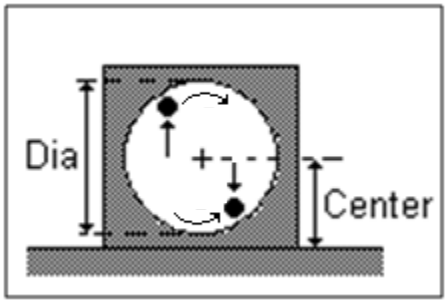


Figure 21

c. Groove width and center measurement:

This function can be executed using [9] key. In this function, an internal groove on shaft or bore is measured by

measuring its top and bottom edges. The result shows groove width and either the groove edges or center as per user selection in the user setup. The result is displayed on the display and gets stored in result buffer as “Grv_Wdt”, “Grv_Cnt”, “Grv_UEd and “Grv_LEd”. This is illustrated in the Figure 21.

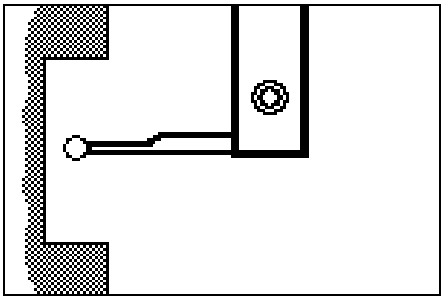


Figure 21

d. Ledge width and center measurement:

To perform this function follow below key sequence

In this function, an external protrusion or ledge is measured in an auto cycle. Similar to that in groove, the upper edge and lower edges are measured and the width and center are calculated. To avoid interference with the job, the operator need to adjust the surface scanning and then press [ENT] key proceed with the second surface scanning. The result shows ledge width and height of selected the ledge edges or center. The result is displayed on the display and gets stored in result buffer as “Ldg_Wdt”, “Ldg_Cnt”, “Ldg_UEd” and “Ldg_LEd”. This is illustrated in the Figure 22.

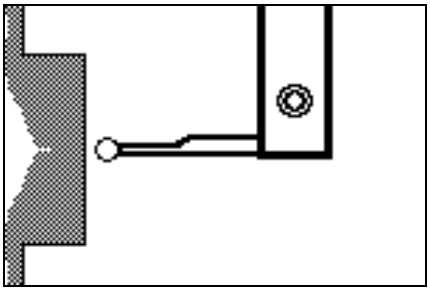


Figure 22.

12. Secondary Measurements:

Other than the basic measurements, there are some other functions which are illustrated below:

a. **Multiple references:**

Multiple references can be stored and recalled. However it is suggested that the additional new references should be kept as low as possible. Most of the jobs can be measured by maximum two new references. This can be done by pressing the [] key, two options will be displayed on the screen.

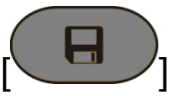
1. Zero pt 1 on part
2. Zero pt 2 on part

These are two references other than base plate referencing. User can set new reference by following two methods.

12.1.a. Select a function by pressing the appropriate function key, which should be set as the current reference.

User can execute the following function to set reference

1) Contact above
2) Contact Below
3) Bore Above
4) Bore Below
5) Shaft Above
6) Shaft Below
7) Shaft Center
8) Bore Center
9) Groove Center.

12.1.b. For selecting reference from the memory by pressing the [] key. Following results can be selected from the memory for reference:

1. Contact Above
2. Contact Below
3. Bore Above

4. Bore Below
5. Bore Center
6. Shaft Above
7. Shaft Below
8. Shaft Center
9. Groove Edges
10. Ledge Edges
11. Groove Center
12. Ledge Center

gets stored in result buffer as “Ldg_Wdt”, “Ldg_Cnt”, “Ldg_UEd” and “Ldg_LEd”.

The result can be taken as a reference point. The result is stored in result buffer as “Ref” tag followed by the reference number and its value. Also the active reference image will display on display window.

b. **Multiple references Recall:**

The previously saved references can be called by executing this key sequence [

],[

],[

] then 3 optiong will display on the screen

1) Reference Point.
2) Zero Pt 1 on Part
3) Zero Pt 2 on Part

By selecting option user can select the required reference point.

c. **MIN, MAX, DELTA Measurement:**

This function can be performed by executing following key sequence. [MENU] ,[▽³]],[▽³] .

Then two options will be displayed on the screen.

1. Min-Max Top Side
2. Min-Max Bot side.

Select the any one option.

1. MIN: The minimum value of the scanned surface.
2. MAX: The maximum value of the scanned surface.
3. DELTA: The difference between MIN and MAX.

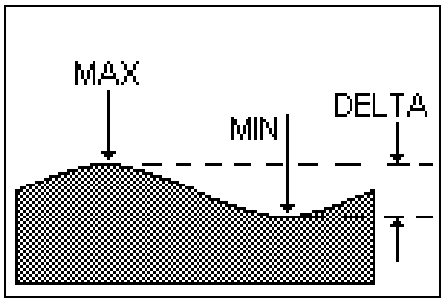


Figure 24

The machine keeps on updating the MIN, MAX and DELTA values till [C] key is pressed. On [C] key, the results are displayed screen and stored in the result buffer. The function can be effectively used to align heavy jobs on fixtures. Press [C] key again to exit from the function.

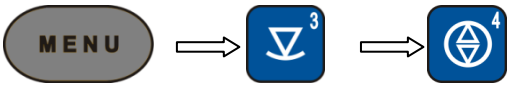
d. **Distance Measurement:**

This function can be performed by executing following key sequence. [MENU] ,[▽³]],[▽¹] .

EL50M shows previously stored results. The result can be selected by browning in the result buffer using [ ],[ ], [ ],[ ] keys. Controller calculates and shows the difference between the two selected results.

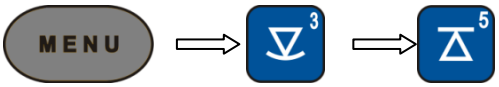
e. **Reset Zero at any Position:**

In this function, current position of the main axis is set to zero and this is taken as new reference for further measurement. To perform this function execute the following key sequence.



f. **Preset At Position:**

In this function, current distance of axis set to value entered by user and this is taken as new reference for further measurement. To perform this function executes the following key sequence.



g. **Squareness (Perpendicularity) Measurement:** This fuction can be performed by pressing [ ] key. Perpendicularity error of a work piece can be determined using a Digital Dial. This machine has the facility to hold a dial indicator directly at the place where the normal measuring probe is clamped. A special dial holder is provided along with the machine. Refer below Installation figures.

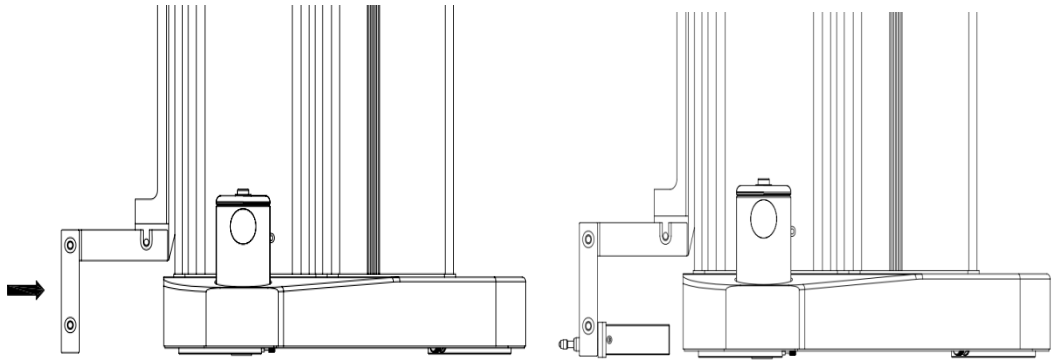


Figure 25

PLACE DIAL INDICATOR AND HOLDER ASSEMBLY AS SHOWN IN THE Figure 25.

The perpendicularity error of a work piece can be measured on "Frontal" as well as "Lateral" faces. When a ⊥⁰ key is pressed, the operator needs to enter the no of Steps. This is basically the height for which the perpendicularity / squarness is to be measured. Before pressing enter, ensure that the Digital Dial is connected to the machine using its carrier and it's positioned on the surface. Make sure that the Digital Dial is pressed on the job by approximately 0.5mm by moving either the job or the machine. After entering the range, the controller will first make the display.

This function can be executed in two ways:

1. Manual Squareness: Press [⊥⁰] key and select Manual Squareness option. In this mode the operator needs to enter the dial indicator values for each measurement step. Further steps are explained below.

2. Auto Squareness: For this option press [⊥⁰] key and select Auto Squareness option. In this mode the EL50M controller can read the Dial indicator readings using a Opto RS232 cable provided by the dial manufacturer. Further steps are explained below.

Perpendicularity error of a work piece can be measured on “Frontal” or “Lateral” face. After Manual or Auto squareness selection, the operator needs to select frontal or Lateral squareness depending on which face is to be checked. Then enter the measurement range. This is basically the height for which the perpendicularity / squareness is to be measured. Before pressing enter, ensure that the Digital dial is connected to the machine using its carrier and it is positioned on the surface. Make sure that the Digital dial is pressed on the job by approximately 0.5mm by moving either the job or the machine. After entering the range, the controller will first make the Digital dial reading “Zero” in case of Auto squareness. For manual squareness the operator should make the dial zero. The movement of the Digital Dial is shown on the screen in front of “X-Axis”. The display shows Main axis and Digital dial as Auxiliary axis. After completing the entered distance press [C] key and select “Per. Err & Angle” to display the results. The controller will now show the results as “Error” and “Obtuse Angle”.

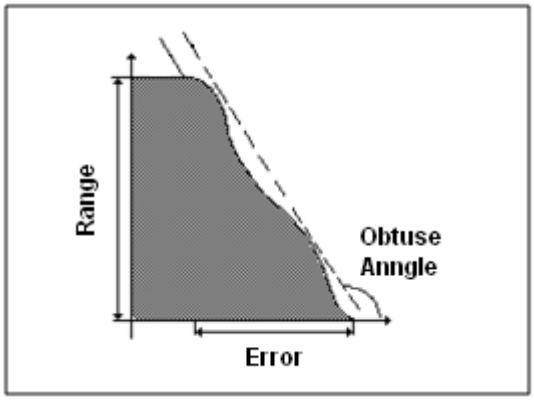


Figure 26

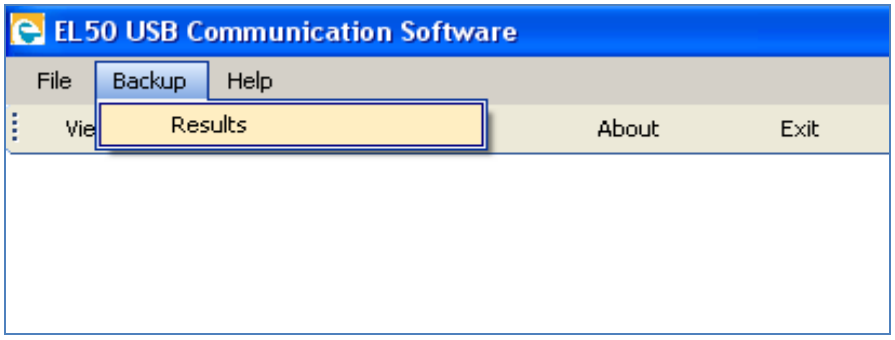
Press [C] key to exit from this measurement.

13. PC utility:

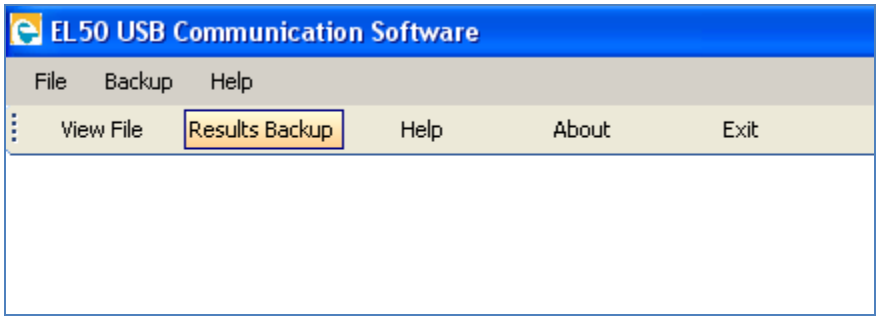
An application CD is provided along with the machine which contains Software Utility for communication with the EL50M controller through the USB port. Using this utility, the operator can backup result memory, view result memory and print it. Following options are available for the operator.

a. Backup of Result Memory:

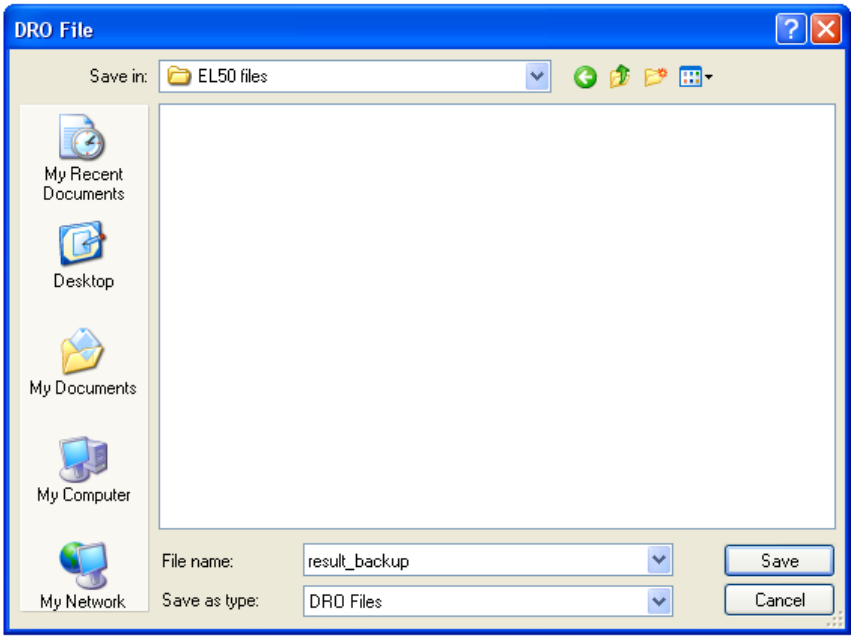
Backup of result buffer can be done by click on “Backup” file menu then "Results” as shown in the figure below.



OR

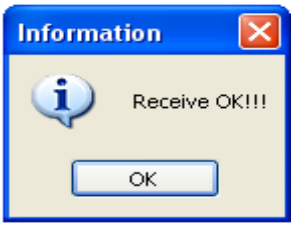


On pressing the button, the operator is prompted to enter a file name. Extension of this file is “.DRO”.



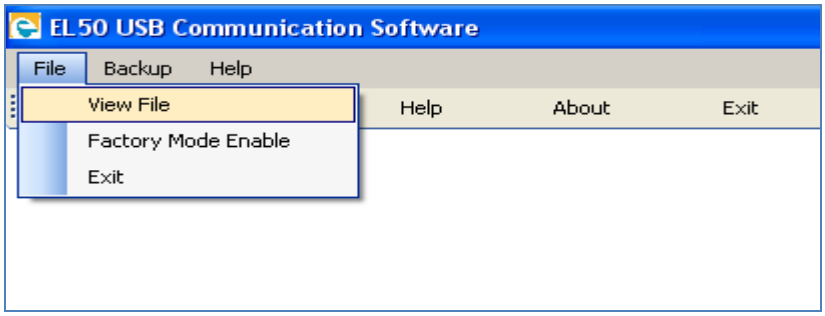
Press save button to continue. The controller starts sending the result buffer data to the PC. Downloading the status is shown on status strip as shown below.

The PC shows “Receive OK!!!” Information box after the data transfer is over as shown below:

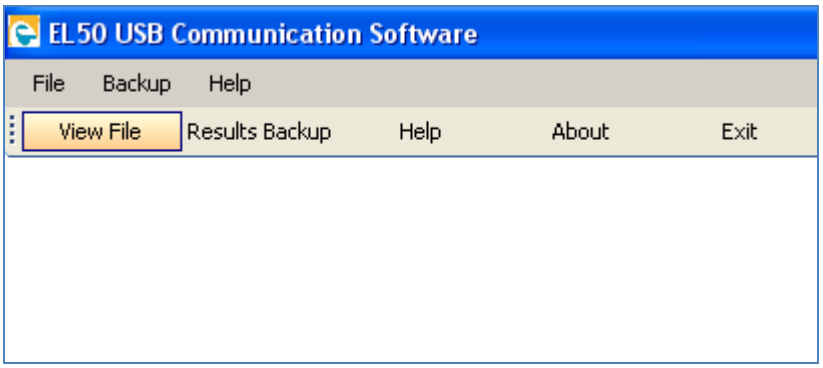


b. View File:

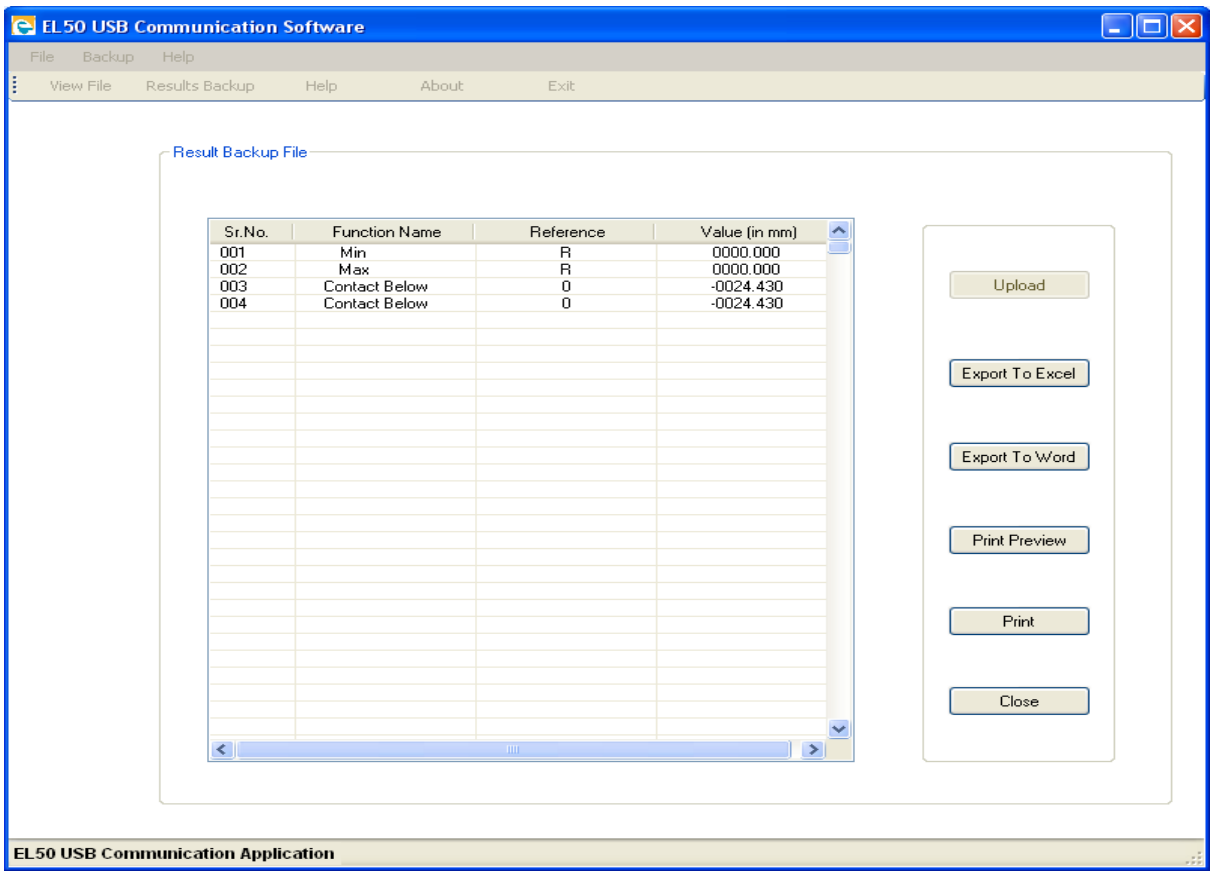
This can be done using click on “File” menu then “View file” as shown in below.



OR



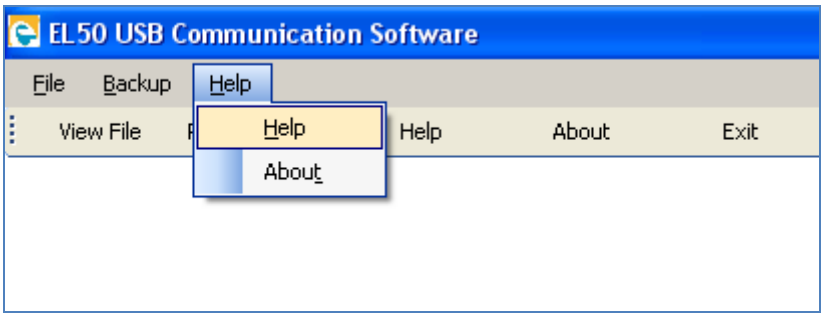
It shows all backup results as,



This will show you all readings of operation and five buttons as,

Export to Excel – To save as current file as Excel file.
Export to Word – To save as current file as Word file.
Print Preview – To see print preview of current file.
Print – To print current file.
Close – To close current file view.

Note: For more detail description click on Help button in the EL50 USB communication Software.



This will show the *EL50M USB Communication Software User Guide* in .pdf format.

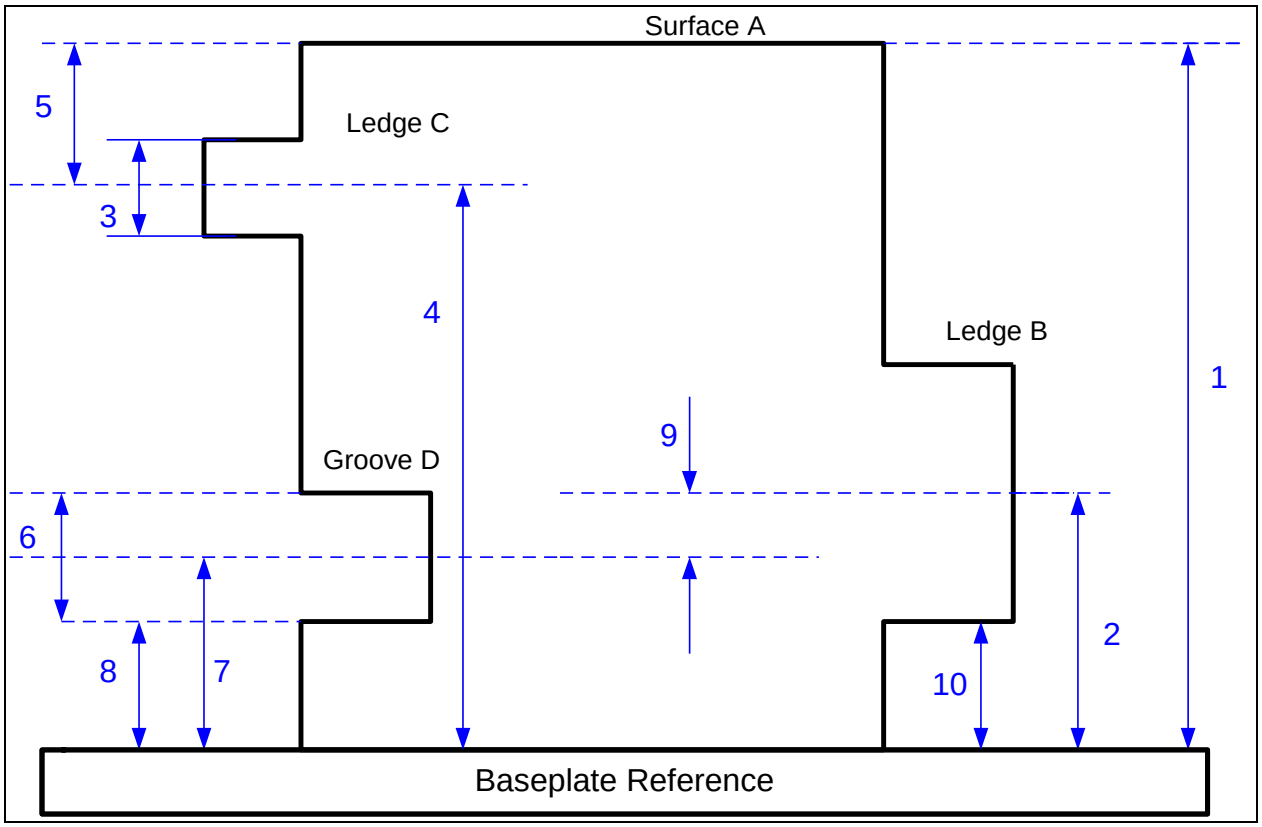
14. **Tags Used in Result Memory:** Following table lists all the tags used in result buffer and their descriptions.

Sr. No.	Tag	Description
1	Con_Abo	Contact Above
2	Con_Blo	Contact below
3	Shft_Ab	Shaft Above
4	Shft_Bl	Shaft below
5	Shft_Cn	Shaft Center
6	Shft_Di	Shaft Diameter
7	Bor_Abo	Bore Above
8	Bor_Blo	Bore Below
9	Bor_Cnt	Bore Center
10	Bor_Dia.	Bore Diameter
11	Grv_Wdt	Groove Width
12	Grv_Cnt	Groove Center
13	Grv_UEd	Groove Upper Edge
14	Grv_LEd	Groove Lower Edge
15	Ldg_Wdt	Ledge Width
16	Ldg_Cnt	Ledge Center
17	Ldg_UEd	Ledge Upper Edge
18	Ldg_LEd	Ledge Lower Edge
19	Dif_Hgt	Difference between two results
20	Squrness	Squareness
21	Lat Squr	Lateral squareness
22	Frn Squr	Frontal squareness
23	Angle	Squareness angle
24	Min	Minimum Result in MIN-MAX-DELTA Function
25	Max	Maximum Result in MIN-MAX-DELTA Function
26	Delta	Maximum minus Minimum Result in MIN-MAX-DELTA Function
27	Ref 0	Base Plate Reference
28	Ref 1	Reference 1
29	Ref 2	Reference 2

15. Application Examples:

Example 1: Determining height and width measurements of a test-piece.

Consider the following test piece. The aim is to measure all the dimensions as shown in the figure.



Dimension 1: Adjust the probe above the Surface 'A' and press [ ] key. The EL50M contact to top surface and give beep with required result will be displayed on the screen and result stored in result buffer as as "Con_Abo".

Dimension 2 and 10: Adjust the probe below the Ledge B and press [MENU] key, then [ ] key, then [ ]. Now Ledge function will execute. EL50M controller gives beep with message "Position the Probe Press Enter" after contact below surface. Then place probe above the Ledge B and Press [ENT] key. The controller will display results on screen and stored result in result buffer as "Ldg_Cnt" and "Ldg_LEd"

Dimension 3 and 4: Adjust the probe below the Ledge C and press [MENU] key, then [3] key, then [2]. Now Ledge function will execute. EL50M controller gives beep with message “Position the Probe Press Enter” after contact below surface. Then place probe above the Ledge B and Press [ENT] key. The controller will display required center and width on screen and saved result in result buffer as “Ldg_Cnt” and “Ldg_Wdt”.

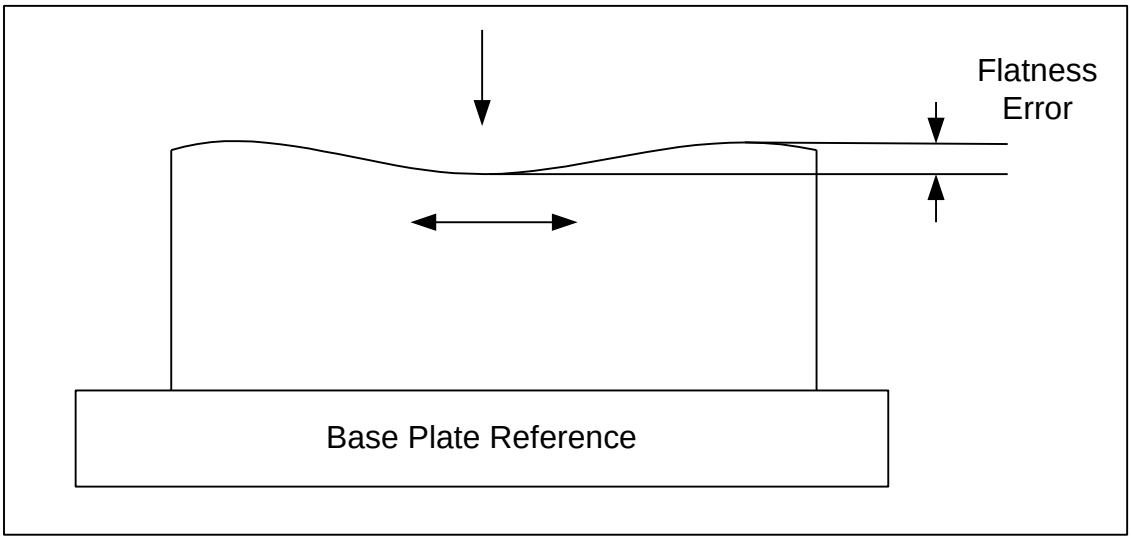
Dimension 5: To determine this dimension press [MENU] key, then [3] key, then [1] key . Now EL50M controller will prompt for the selection of first result from result buffer. Scroll using [◀],[▶], [▲] and [▼] keys and select dimension 1 using [ENT] key. The controller will prompt to select the second result. Scroll to dimension 4 using [◀],[▶],[▲] and [▼] keys and press [ENT] key. The controller will calculate the difference between the 2 results and will display the result. Thus dimension 5 will displayed.

Dimension 6, 7 and 8: Adjust the probe inside the Groove D and press [9] key. Then EL50M controller executes Groove function. The controller gives beep after detect Groove Top surface and then contact Groove below surface. After scan both surface, controller will display required center, width and bottom height as “Grv_Cnt”, “Grv_Wdt” and “Grv_LEd”.

Dimension 9: Press [MENU] key, [3] key, then [1] key. Then Distance function will execute. Now select dimension 2 and 7 using the [▲], [▼],[◀],[▶]and [ENT] keys. The controller will calculate the difference and display. Thus dimension 9 gets displayed and is added in the result buffer.

Example 2: Determining the Flatness error of a test-piece.

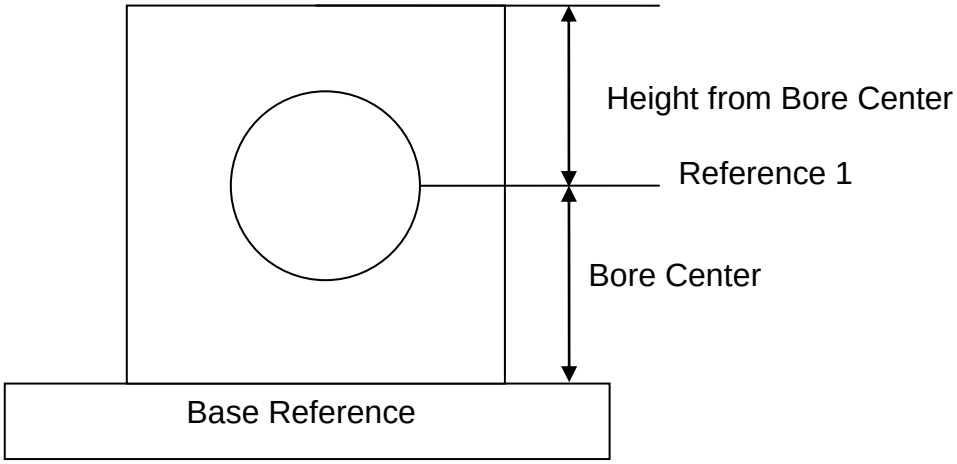
The flatness error of a test-piece can be determined by the following procedure.



1. Clamp a cylindrical probe in probe holder and position it shortly above the test-piece.
2. Adjust the probe above job and select the “Min-Max from Top Side” option from Function menu for that follow the following key sequence.

3. On complete scan of the test-piece, press [C] key. The controller shows result “Min”, “Max”, and “Delta”.
4. The difference between “Min” and “Max” is given by “Delta” which is the flatness error of the test-piece.

Example 3: Making the Bore Center Zero and Measure the surface height from the Bore center.



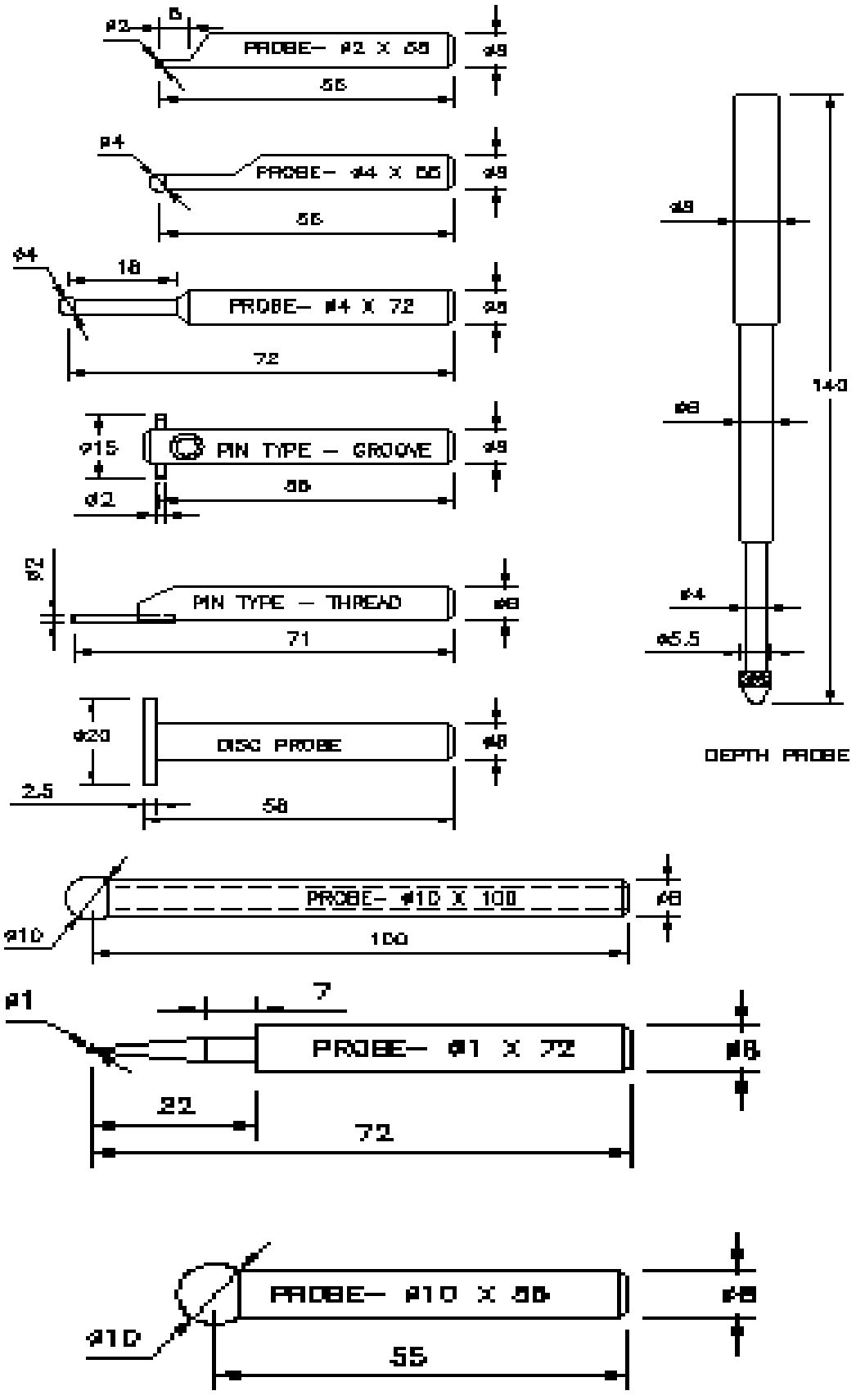
1. Perform reference to Base at the base.
2. Press [ ] key, and select Reference 1 or Reference 2.
3. Pressing [ ] key and referring to the procedure given in the previous section 12 measure bore center. Here the reference 1 is placed at the bore center. Similarly different measurements can be made zero for reference 1 and 2 as discussed in section 13.1
4. Measure the top surface by pressing [ ] key and referring to the procedure given in the previous section 12. This result will be with respect to the reference 1.

16. Maintenance and Care:

ALL MAINTENANCE WORK APART FROM DESCRIBED BELOW WILL BE CARRIED OUT EXCLUSIVELY BY AUTHORISED OPTIHITE SERVICE AGENT.

1. Clean the surface plate and air cushioning pads periodically. Use soft and clean fabric soaked with alcohol for cleaning.
2. All probes should be kept in a Probe Box after use to avoid any type of Damage.
3. If the instrument is not in use, enclosed it with dust cover.
4. Apply antirust spray/oil on super finished faces of setting master when not in use.
5. OptiHite consists of a rechargeable battery.
    - Battery status indication is provided on the controller unit.
    - If battery low LED indication is ON, battery charging is essential.
    - Battery charging device (mains AC adaptor) is included in standard scope of supply.
    - To charge batteries connect a charging AC adaptor to the controller unit at corresponding socket. Switch on the mains supply.
    - Charging will be displayed by LED indication on the controller unit.
    - It takes approximately consecutive 4 hrs. to charge a discharged battery.
    - Do not use any other device to recharge the battery.
    - **REMOVE OR SWITCH OFF AC ADAPTOR AFTER COMPLETION OF EVERY CHARGING.**
    - **TO IMPROVE BATTERY LIFE, AVOID BATTERY CHARGING AT INTERMEDIATE LEVEL BEFORE IT GETS COMPLETELY DISCHARGED.**
6. The outer body of the instrument can be cleaned with slightly moistened fabric. Do not clean any part of the instrument with harsh chemicals like acetone or detergents.
7. Do not connect or disconnect any connector from controller unit when the instrument is in “Switched ON” condition. This may damage controller unit or electronic /electrical components.

17. Optional Accessories:



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